Minicolloque n° 2 **☒Oral** **☐ Poster**

Biomimetic semi-permeable vesicles as microreactors to modulate the phase behaviour of macromolecules

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The understanding of the dynamics of the macromolecular assembly in solution, like liquid-liquid phase separation (LLPS), represents challenges in many fields. In cell biology, they represent a great interest, because of their involvement in subcellular processes [1] and human diseases [2,3].

To investigate these assemblies, we have developed a microfluidics method to produce biomimetic microreactors, called osmosomes [4]. These microreactors are vesicles composed of a lipid bilayer, made semi-permeable to small molecules (< 2 kDa), with the help of the membrane pore protein α-hemolysin [5]. They allow (1) encapsulating macromolecules in their ideal solubilization conditions, (2) to modify the quality of the solvent (pH, ionic strength, reducing agents, etc.) by controlled exchanges through the membrane pores, and (3) to probe the phase transitions of macromolecules. We demonstrated that the osmosomes solvent exchange rates can be less than 1 min. This allows to tune the macromolecules assembly with control of the thermodynamic pathway as observed for the pH-induced LLPS of wheat proteins (Figure).

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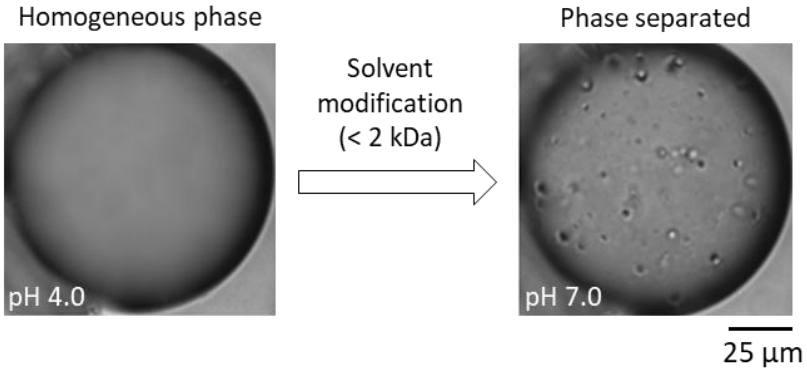

Figure: Solvent-triggered LLPS of wheat proteins within an osmosome.